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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/854,580      | 05/15/2001  | Qian Lin             | 10006299            | 8971             |

7590 12/23/2005

HEWLETT-PACKARD COMPANY  
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EXAMINER

HUNG, YUBIN

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                  |  |
|------------------------------|------------------------|------------------|--|
| <b>Office Action Summary</b> | Application No.        | Applicant(s)     |  |
|                              | 09/854,580             | LIN ET AL.       |  |
|                              | Examiner<br>Yubin Hung | Art Unit<br>2625 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 22 November 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-4, 6, 8-12, 14-18, 20, 21, 25 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-4, 6, 8-12, 14-18, 20, 21, 25 and 27-31 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 15 May 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

***Response to Amendment/Arguments***

1. This action is in response to amendment filed November 22, 2005, which has been entered.
2. Claims 5, 7, 13, 19, 22-24 and 26 have been cancelled; claims 30 and 31 have been added. Claims 1-4, 6, 8-12, 14-18, 20, 21, 25 and 27-31 are still pending.
3. In view of Applicant's amendment, the 35 USC § 112 rejections have been withdrawn.
4. Applicant's arguments filed 07/02/04 have been fully considered but they are not persuasive; see below.
5. **In remarks Applicant argued in substance:**
  - 5.1 (1) *that Fowler does not disclose nor could reasonably be interpreted to disclose (the limitation of cancelled claim 7 now incorporated into amended claim 1) that target values for a mean value or a variation value of the pixels in human faces are produced (P. 11, 2<sup>nd</sup> paragraph); (2) that there is no motivation to combine (P. 12, 1<sup>st</sup> paragraph); and (3) that the combination is unlikely to succeed (P. 12, 2<sup>nd</sup> paragraph)*

However, regarding (1), as per the analysis of claim 7 in the office action mailed 8/22/05 and Applicant concurred [page 11, first paragraph of the response], Fowler discloses mapping the gray levels of a region (a strip) of an image such that target values for a mean value and a variation value of the pixels in the region are produced. The motivation to apply Fowler's enhancement technique to human face has been provided in the previous rejection of claim 7.

Regarding (2), in response to applicant's argument that Fowler is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Fowler not only is analogous art but also is very pertinent because it teaches an efficient method for enhancing a specific area (a strip) of an image that produces desired results (i.e., obtaining target mean and variation of pixels in the area of interest).

Regarding (3), to the contrary of Application's assertion, once the face has been located (per Schildkraut) and intensities (i.e., gray levels) measured, Fowler's method can easily be applied to enhance the face region in such a way that the gray levels of its pixels will have a target mean, a target variation or both, as one of ordinary skill in the art at the time of the invention can easily accomplish.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 8, 10, 15, 16, 21 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), in view of Kado et al. (US 6,181,806) and Fowler (US 5,410,618).

8. Regarding claim 1, similarly claims 8, 15 and 21, Schildkraut discloses:

- automatically detecting human faces in an image using face detection algorithms and automatically locating the human faces in the image [Fig. 2, numeral S10; Fig. 6; Col. 4, line 13-Col. 5, line4]

Schildkraut does not expressly disclose

- automatically enhancing an appearance of the image by using a mapping technique to produce the image with target levels for a mean value or a variation value of the pixels in the human face

However, Kado discloses automatically measuring brightness (i.e., lightness levels) of human faces [Fig. 14, ref. 16 and col. 7, lines 33-36] and automatically enhances the

image's brightness based on the measure brightness [col. 7, lines 44-46]. In addition, Fowler discloses linear mean invariant transforms (i.e., a mappings) that enhance general images in such a way that the resultant image has a target mean [Col. 1, lines 30-40]. Fowler further discloses a mapping technique specifically designed for lofargram images [Fig. 1, refs. 3-7; Col. 3, lines 15-30; Col. 6, line 48-Col. 7, line 5. Note that an example of a lofargram image can be found in the first slide of the presentation made by Vincent Premus in the 7<sup>th</sup> Annual ASAP '99 Workshop.]

Schildkraut, Kado and Fowler are combinable because they all have aspects that are from the same field of endeavor of image enhancement (note that red eye correction is a form of image enhancement).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Schildkraut with the teachings of Kado and Fowler to enhance detected human faces by using a mapping technique. The motivation would have been to improve visual quality, among other things, as Fowler indicated in [Col. 1, lines 11-20 and Col. 2, lines 28-35]. In addition, as the purpose of red eye correction is to provide an facial image with a better visual quality, it would have been obvious to go one step further by enhancing the overall visual quality of the faces (and not just the eyes) in the image since doing so would provide even better results to the clients (e.g., by a photo-processing lab to its customers).

Therefore, it would have been obvious to combine Kado and Fowler with Schildkraut to obtain the invention as specified in claim 1.

9. Regarding claim 2, and similarly claims 10 and 16, Kado further discloses
  - wherein the module for enhancing the appearances of the image includes a module for automatically enhancing lightness levels of the human faces [Fig. 14, ref. 16 and col. 7, lines 44-46]
10. Regarding claim 27, and similarly claims 28 and 29, Schildkraut further discloses
  - automatically locating eyes in the human faces [Fig. 2, numerals S16-S30; Figs. 9, 11]
11. Regarding claims 30 and 31, Fowler further discloses mapping using the recited equations. [Col. 6, line 48-Col. 7, line 5. Note that Eq. 13 is a more general mapping function that includes both scaling and offsetting. When only offsetting is performed, i.e., A = 1, Eq. 13 becomes P + B (note that in line 1 of col. 7 "w" should have been "u"). On the other hand, when only scaling is performed, i.e., B = 0, Eq. 13 becomes AP + (1-A)u. Note further that A is the difference of the new and the original means and A is the square root of the ration of the new and the original variants, per Eqs. 11 and 12 in col. 6]

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12. Claims 3-4, 11-12 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), Kado et al. (US 6,181,806) and

Fowler (US 5,410,618) as applied to claims 1, 2, 8, 10, 15, 16, 21 and 27-31 above, further in view of Center, Jr. et al. (US 6,680,745).

13. Regarding claims 3-4, and similarly claims 11-12 and 17-18, the combined invention of Schildkraut, Kado and Fowler discloses everything except the following, which Center teaches:

- wherein the module for enhancing the appearances of the image includes a module for automatically enhancing contrast levels (claim 3) or color levels (claim 4) of the human faces [Fig. 1; col. 2, lines 55-60. Note that while Center discloses adjusting the camera's settings, one of ordinary skill in the art would have recognized that such changes can be achieved by image processing means; see, for example, the analysis of claim 2 above in which Kado is relied upon for enhancing brightness]

The combined invention of Schildkraut, Kado and Fowler is combinable with Center because they have aspects that are from the same field of endeavor of face detection.

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Schildkraut, Kado and Fowler with the teaching of Center by enhancing an appearance of the image by changing the contrast and/or color (in addition to changing brightness as Kado disclosed). The motivation would have been to obtain better images, as Center indicated in column 2, lines 55-60.

Therefore, it would have been obvious to combine Center with Schildkraut, Kado and Fowler to obtain the inventions as specified in claims 3 and 4, respectively.

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14. Claims 6, 14, 20 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al. (US 6,292,574), Kado et al. (US 6,181,806) and Fowler (US 5,410,618) as applied to claims 1, 2, 8, 10, 15, 16, 21 and 27-31 above, further in view of Acker et al. (US 6,009,209).

15. Regarding claim 6, and similarly claims 14, 20 and 25, the combined invention of Schildkraut, Kado and Fowler discloses all limitations except the following, which Acker et al. teaches:

- reducing or removing the red eye artifact from the human faces [Fig. 5, numeral 109; Fig. 9, numeral 504; Fig. 11; Fig. 13]

The combined invention of Schildkraut, Kado and Fowler is combinable with Acker because they have aspects that are from the same field of endeavor of red eye detection.

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Schildkraut, Kado and Fowler with the teaching of Acker et al. by detecting and removing red-eye effects from the image. The motivation would have been to remove the unpleasant appearance of red-eye defects in an image of a person's face caused by, e.g., a flash when the image was taken in order to produce a more natural-looking face.

Therefore, it would have been obvious to combine Acker et al. with Schildkraut, Kado and Fowler to obtain the invention as specified in claim 6.

***Contact Information***

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung  
Patent Examiner  
December 16, 2005



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